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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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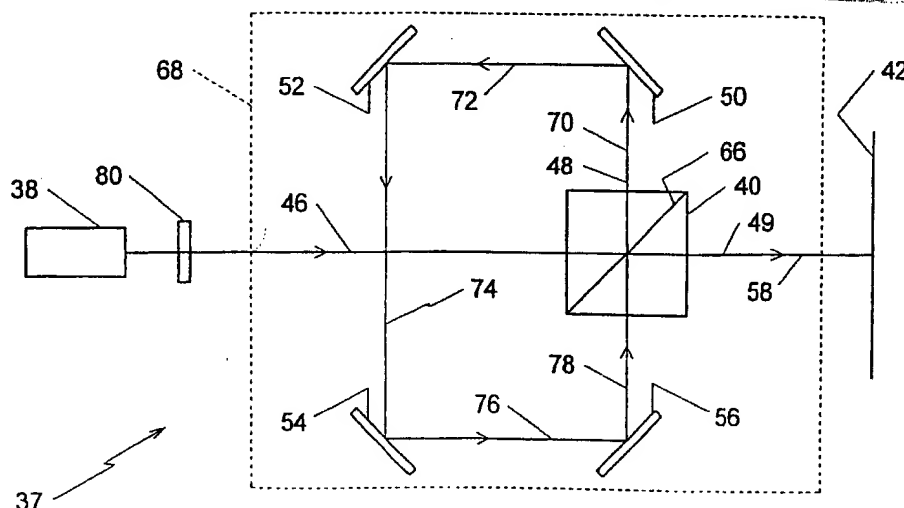
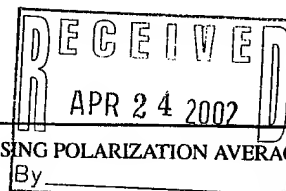
(43) International Publication Date  
9 August 2001 (09.08.2001)

PCT

(10) International Publication Number  
**WO 01/57581 A3**

- (51) International Patent Classification<sup>7</sup>: G02B 27/48 (74) Agents: HAVERSTOCK, Thomas, B. et al.; Haverstock & Owens LLP, 162 North Wolfe Road, Sunnyvale, CA 94086 (US).
- (21) International Application Number: PCT/US01/40049
- (22) International Filing Date: 6 February 2001 (06.02.2001) (81) Designated States (*national*): CA, JP, KR.
- (25) Filing Language: English (84) Designated States (*regional*): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).
- (26) Publication Language: English
- (30) Priority Data: 09/498,703 7 February 2000 (07.02.2000) US Published: — with international search report
- (71) Applicant: SILICON LIGHT MACHINES [US/US]; Suite 115, 385 Moffett Park Drive, Sunnyvale, CA 94089 (US). (88) Date of publication of the international search report: 11 April 2002
- (72) Inventor: TRISNADI, Jahja, I.; 21800 San Fernando Ave. Cupertino, CA 95014 (US). For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND APPARATUS FOR REDUCING LASER SPECKLE USING POLARIZATION AVERAGING



(57) Abstract: A method and apparatus for reducing speckle uses polarization averaging. A polarizing beam splitter divides a first polarized laser output into a second polarized laser output and a third polarized laser output. A plurality of mirrors creates an optical path difference between the second and third polarized laser outputs. The optical path difference is at least about a coherence length for the first polarized laser output. The second and third polarized laser outputs are combined into a fourth laser output, which illuminates an depolarizing screen. If a human eye or an optical system having an intensity detector views the depolarizing screen, the eye or the intensity detector will detect reduced speckle, which results from uncorrelated speckle patterns created by the second polarized laser output and the third polarized laser output.

WO 01/57581 A3

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# INT. NATIONAL SEARCH REPORT

International Application No

PC1/US 01/40049

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 G02B27/48

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02B G03H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>US 5 463 497 A (IMAI SHUNZO ET AL) 31 October 1995 (1995-10-31)</p> <p>column 14, line 29 - line 67 column 15 - column 17 page 18, line 1 - line 2 figures 9A-9C</p> <p>---</p> <p>-/--</p>	<p>1, 16, 19, 34, 41, 44, 50, 56, 59, 62, 63</p>

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

20 November 2001

Date of mailing of the international search report

11/12/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040. Tx. 31 651 epo nl.  
Fax: (+31-70) 340-3016

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>GOODMAN J W : "Some Fundamental Properties of Speckle"</p> <p>JOURNAL OF THE OPTICAL SOCIETY OF AMERICA, vol. 66, no. 11, November 1976 (1976-11), pages 1145-1150, XP002181682</p> <p>NEW YORK US</p> <p>page 1147, right-hand column, paragraphs 3,4</p> <p>page 1148, left-hand column, paragraph 3</p> <p>---</p>	<p>1,16,19, 34,41, 44,50, 56,59, 62,63</p>
A	<p>US 4 511 220 A (SCULLY CHARLES N)</p> <p>16 April 1985 (1985-04-16)</p> <p>abstract; figures</p> <p>---</p>	1-68
A	<p>US 5 233 460 A (PARTLO WILLIAM N ET AL)</p> <p>3 August 1993 (1993-08-03)</p> <p>abstract; figures</p> <p>---</p>	1-68
A	<p>KUNDU P C ET AL: "REDUCTION OF SPECKLE NOISE BY VARYING THE POLARISATION OF ILLUMINATING BEAM"</p> <p>JOURNAL OF OPTICS, vol. 4, no. 3, 1975, pages 63-67, XP002183475</p> <p>MASSON, PARIS.. FR</p> <p>ISSN: 0150-536X</p> <p>the whole document</p> <p>-----</p>	1-68

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/40049

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5463497	A	31-10-1995	JP 2770984 B2	02-07-1998
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US 5233460	A	03-08-1993	NONE	
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